

# EXHIBIT 4

**UNITED STATES DISTRICT COURT  
MIDDLE DISTRICT OF NORTH CAROLINA**

SHAUNA WILLIAMS, et al.,

*Plaintiffs,*

v.

REPRESENTATIVE DESTIN HALL, in his official  
capacity as Chair of the House Standing Committee on  
Redistricting, et al.,

*Defendants.*

Civil Action No. 23 CV 1057

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NORTH CAROLINA STATE CONFERENCE OF  
THE NAACP, et al.,

*Plaintiffs,*

v.

PHILIP BERGER, in his official capacity as the  
President Pro Tempore of the North Carolina Senate, et  
al.,

*Defendants.*

Civil Action No. 23 CV 1104

**SUPPLEMENTAL REBUTTAL REPORT OF DR. JONATHAN RODDEN**

March 31, 2025

## **I. INTRODUCTION AND SUMMARY OF FINDINGS**

I submitted my expert report in this case on August 1, 2024, and a reply report on October 17, 2024. My understanding is that experts in this case had the opportunity to update figures, tables, analyses, and conclusions from their initial reports based on 2024 election results. Dr. Michael Barber submitted a supplemental expert report on March 17, 2025. He considered 2024 election results in the three paragraphs in Section 3.3 of his new report (pages 14-15). However, he has also submitted an additional 29 pages of entirely new material in response to my reply report and deposition questions, including new redistricting simulations and statistical analyses. Although I had insufficient time to fully analyze his new statistical approaches and respond with my own follow-up statistical analysis, I provide a brief initial response to his main claims that relate to my earlier reports in this case.

First, Dr. Barber provides additional critiques of the “envelope analysis,” which is an analysis that the Supreme Court has accepted and reaffirmed in racial gerrymandering cases as one part of a holistic approach that provides descriptive measurements of the racial differences between precincts that are included and excluded from the challenged districts within a so-called “county envelope.” Dr. Barber’s analysis seems to misinterpret this “envelope analysis” as a statistical test of racial predominance, rather than as a largely descriptive enterprise that courts consider along with other intensely local features of the way the challenged map interacts with local racial geography, demographics, and administrative boundaries.

Second, Dr. Barber responds to an observation in my reply report in which I use Dr. Barber’s race-blind redistricting simulations to confirm that the distribution of race across districts in the Enacted Plan makes it an extreme outlier relative to those plans. Dr. Barber claims that this can be explained by the fact that his simulations were insufficiently respectful of the criteria that he suspects were considered by the legislature when drawing the districts, and above all, insufficiently gerrymandered in favor of Republican candidates. Dr. Barber could have taken simple steps to account for these conjectures when conducting his additional analysis but declined to do so.

Third, Dr. Barber returns to his earlier claim that he can demonstrate that race played no role in North Carolina’s redistricting plan simply by running precinct-level regressions that include both race and party and noting that the coefficients for race are extremely unstable when partisanship is included in the regression. On the contrary, this instability is driven by the high correlation between race and party, which renders Dr. Barber’s regressions useless in attempting to disentangle the role of race and party.

Finally, in my previous report, I analyzed some draft Congressional maps that had been considered by the Legislature before deciding upon the Enacted Map and demonstrated that the distribution of Black voting-age population across districts in the Enacted Plan was anomalous, even among the pro-Republican plans considered by the Legislature. In his supplemental report, Dr. Barber attributes this phenomenon to improvements in the partisan performance of the Enacted Plan for Republican candidates and efforts to avoid pairing incumbents. In this report, I respond that the partisan performance of these comparison maps is as good or better in these earlier maps than in the Enacted Plan, and incumbent protection cannot explain the differences. I also take a

closer look at these alternative maps and demonstrate that it is possible to achieve similar partisan goals while drawing district boundaries that correspond less clearly to race.

## II. COUNTY ENVELOPE ANALYSIS

A large section of Dr. Barber's supplemental report is critical of the "county envelope" analysis. This analysis is part of a holistic approach that was accepted by the Supreme Court in *Cooper v. Harris*, 581 U.S. 285 (2017), and reaffirmed in *Alexander v. South Carolina State Conference of the NAACP*, 602 U.S. 1 (2024). As part of a series of analyses, the "county envelope" analysis focuses on the set of counties that contain a challenged district and compares the racial characteristics of the precincts that have been placed within, and drawn out of, the district in question. When individual-level data on partisanship are available, as in this case, it is also possible to examine whether any racial differences are also present *within* each partisan group. This is primarily a measurement exercise that is only one component of a holistic approach that also includes analysis of local racial demographics, the geographic arrangement of groups and in relation to city, municipal, and county boundaries, and localized violations of traditional redistricting criteria like compactness and respect for county and municipal boundaries.

Dr. Barber seems to reject the value of localized analysis, and it is absent from his reports. Rather, he suggests that we should interpret the envelope analysis as a simple, stand-alone statistical test of racial predominance, and as such, he finds it wanting. His reasoning is that if he generates thousands of alternative North Carolina maps via a simulation procedure, many will produce districts for which within the county envelope, the precincts placed in the district have different racial characteristics than those outside the district. This can happen because of, say, the specific clustering of Black or White voters in the corner of a county, along a river, or in a city center, when the computer algorithm is assembling precincts and trying to generate compact, contiguous districts that observe administrative boundaries. Thus, as a rudimentary, stand-alone test of racial gerrymandering, shorn of all context and deeper analysis of location-specific applications of traditional redistricting criteria, Dr. Barber argues that a statistically significant difference between the racial characteristics of precincts within and outside of a district is, by itself, not dispositive. He reasons that when such differences emerged in his simulations, it was purely because of the spatial arrangement of racial groups vis-à-vis administrative boundaries, and not because of any intentional efforts. If a correlation between race and a precinct's inclusion in a district is uninformative in his simulations, he reasons, it must be uninformative in a challenged district in the real world.

However, it is not my understanding that courts use the "envelope analysis" as an isolated, stand-alone test. On the contrary, once racial differences are observed within the envelope of a challenged district, it is necessary to conduct a careful local analysis of the racial geography in relation to municipal and county boundaries, bodies of water, neighborhoods, and other features of natural and human geography to ascertain whether, in fact, this is an instance of a racial difference that emerges purely from the geographic arrangement of groups and local boundaries, as is the case in Dr. Barber's simulations, or a case where such explanations fall woefully short.

Notably, Dr. Barber skips the local analysis. He does not offer any explanation rooted in traditional redistricting principles for the striking correspondence between race and district boundaries in the Piedmont or Charlotte areas. Rather, he uses a great deal of unnecessary

computational technique, including the generation of thousands of implausible non-contiguous districts that seem to have very little relevance to this case, to make the obvious point that racial differences sometimes emerge by accident when districts must be drawn according to traditional criteria. Indeed so. The crucial question is whether the Enacted Map can be characterized in this way, or whether it follows racial lines and violates traditional redistricting criteria. On this question he provides no guidance, let alone refutation of my analysis.

### III. THE ENACTED PLAN AS A RACIAL OUTLIER

Dr. Barber conducted simulations in both of his reports largely as a way of making the simple point described above. While it is not clear that thousands of alternative computer-generated plans were necessary to make this point, the simulations do offer an analytical opportunity that is more relevant for this case. We can ask whether, when drawing districts without regard to race while trying to abide by traditional redistricting criteria, the algorithm would produce anything resembling the distribution of race across districts found in the Enacted Plan. The answer is an unambiguous “no,” and Dr. Barber does not dispute this. Dr. Barber also does not dispute that the distribution of race in the Enacted Plan is completely different than even the simulated plans that produced 10 Republican seats.

Instead, Dr. Barber raises a critique of his own simulations. Although these simulations were explicitly crafted to mimic the constraints faced by the Legislature with respect to county boundaries and compactness, he introduces a new concern in his second report: the simulations did not capture every possible consideration that legislators *might* have considered. For instance, Dr. Barber hypothesizes that it is possible that some of the simulations “double-bunked” Republican incumbents (that is, they might have created districts in which Republican incumbents would have faced one another), and the Legislature would have presumably avoided this.

Dr. Barber does not explain why he believes the introduction of this additional constraint in the simulations would have changed the distribution of race across districts in a direction that resembles the Enacted Plan, or in any direction at all. In fact, the Republican incumbents from the 2022 election were mostly rural, with residential addresses that were quite far from one another, and it is quite improbable that the introduction of a constraint to prevent incumbent pairings would have had any impact at all on the simulations. Dr. Barber states in footnote 12 that he had access to the addresses of incumbents, yet here, he fails to build incumbent protection constraints into his simulations or simply extract the plans from his existing simulations where incumbents were not paired. If for some reason an effort to pair incumbents was responsible for the extremely unusual distribution of race across North Carolina Congressional districts, Dr. Barber could have easily demonstrated this, but he did not.

Dr. Barber’s simulations show very clearly that it is possible to produce 10 Republican seats without extreme packing and cracking of Black voters or drawing districts that closely follow racial lines. He does not dispute this, but rather, argues that some of the districts in the enacted plan were somewhat safer for Republican candidates than those emerging in the simulations. On page 10 of his supplemental report, Dr. Barber states: “It is notable that the Enacted Map has not only 10 Republican-leaning districts, but 10 safely Republican-leaning districts that have a partisan index at or above 55 percent.” He contrasts this with a claim that the simulations produced only 7 “safe” Republican districts along with three Republican districts that were somewhat more

competitive. However, this characterization of the Enacted Plan is contradicted elsewhere in his report. In the first column of Tables 2, 3, and 4, there are only 9 “safe” Republican seats in the Enacted Plan. The same is true in the first two columns of Table 1, which presents some alternative partisan data.

Dr. Barber’s claim seems to be that to go from a merely good pro-Republican gerrymander to a truly excellent gerrymander, it was necessary to pack and crack Black voters in a way that never emerged in his simulations. He merely asserts this but does not demonstrate it. To do so, he would need to instruct the algorithm to optimize the number of Republican seats above 55 percent or whatever partisan goal he believes the Legislature was seeking, and demonstrate that in this set of plans, Black voters were packed and cracked to a similar extent as in the Enacted Plan. As it stands, we have no way of knowing if the extreme cracking of Black voters in the Piedmont Triad, for instance, was truly necessary to produce seats that Dr. Barber would deem sufficiently safe for risk-averse Republican incumbents.

#### IV. RACE AND PARTY

In both his initial report and in his new report, Dr. Barber argues that race played no role in the construction of the Legislature’s plan. His technique is to run precinct-level regressions within county envelopes, where the dependent variable is a binary indicator for whether the precinct is in or out of the challenged district, and the independent variables include the district’s partisanship as well as its Black voting-age population share (BVAP). My reply report demonstrated that when these regressions include *only* the race variable, Black voters were less likely to be placed in District 6, more likely to be placed in District 12, and less likely to be placed in District 14. My earlier reports reached a similar conclusion using individual-level data and explained in detail how this was achieved, often by drawing district boundaries along lines of racial segregation.

However, Dr. Barber argues that any other variable that might be a significant predictor of a precinct’s inclusion in the district *must* be included in the regression, even if that variable is highly correlated with Black voting-age population. He includes a measure of precinct partisanship in the regression and observes that the coefficient for BVAP changes dramatically. But these regressions do not lead to the conclusion that race was insignificant. Rather, the sign of the coefficient changes, and it becomes highly statistically significant. If Dr. Barber’s regressions are meant to capture something about the legislature’s intent—which seems to be his claim—we are now to believe that Black voters were intentionally placed *in* Districts 6 and 14, and *out* of District 6, even though we can see with our eyes—by looking at maps or calculating simple descriptive statistics—that this is not true. Dr. Barber’s regressions deliver patently nonsensical results, which is a classic sign of multicollinearity in a regression.

As I described in my report, multicollinearity occurs when two or more independent variables are highly correlated, which makes it difficult to determine the independent effect of each variable on the outcome. The problem of multicollinearity is covered in almost every basic statistics textbook.<sup>1</sup> Dr. Barber claims that multicollinearity only affects estimates of uncertainty,

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<sup>1</sup> Consider the undergraduate textbook of N.H. Bingham and John Fry, *Regression: Linear Models in Statistics* (Springer, 2010): “The problem of multicollinearity in fact bedevils the whole subject of Multiple Regression, and is surprisingly common” (page 175).

but not coefficients (or their interpretation). This is not the case. Multicollinearity creates “imprecise estimates of regression coefficients with wrong signs and an implausible magnitude for some regressors because the effects of these variables are all mixed together.”<sup>2</sup> This is especially problematic when the number of observations is relatively small, as is the case with the number of precincts in a county envelope. The coefficients become unstable, so that when a new, highly correlated variable is added to the model, the coefficient on the initial independent variable can become large and statistically significant in the opposite direction. For instance, in regressions on a sample of patients where hypertension is the dependent variable, if one adds several highly correlated independent variables, e.g. obesity, physical activity, and diet, one can obtain absurd results, such as that obesity leads to a lower risk of heart disease. These variables are simply too highly correlated to meaningfully include in the same regression.<sup>3</sup> Dr. Barber insists, based on precinct-level regressions including party and race, that party is the driving force in the creation of the Enacted Plan, and hence that race could not have played a role. This is a bit like running a regression to predict hypertension with highly correlated independent variables and concluding that physical activity is the only driver of heart disease and diet plays no role.

Dr. Barber seems to be making the claim that multicollinearity does not affect the size or direction of coefficients, and hence the inferences one might draw from a regression model plagued by multicollinearity.<sup>4</sup> This is simply not true, as can be ascertained from a simple example. Let us estimate a regression model in which the study area is the envelope of District 6 and the research question is whether precincts were placed in and out of District 6 based on the precinct’s average partisanship in all state elections in 2020 (governor, lieutenant governor, attorney general, secretary of state, treasurer, auditor). The result of this model is presented in the first column of Table 1. The negative coefficient of -2.317, which is highly statistically significant, indicates that as a precinct becomes more Democratic in state elections, it is less likely to be included in District 6.

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<sup>2</sup> Yoo et al., “A Study of Effects of Multicollinearity in Multivariable Analysis,” *International Journal of Applied Science and Technology*, 4(5): 9-19. 2014.

<sup>3</sup> For a discussion of the problem of multicollinearity in epidemiology, see Vatcheva, KP, Lee M, McCormick JB, and Rahbar MH. “Multicollinearity in Regression Analyses Conducted in Epidemiologic Studies,” *Epidemiology* 6(2): 227. 2016

<sup>4</sup> If our goal is to come up with the best possible model to *predict* whether precincts are included or excluded from a district, there is little concern with including highly correlated independent variables in the model. The best predictive model may very well include some highly correlated covariates. The issue here, however, is substantive interpretation of the coefficients, which is undermined by multicollinearity.



**Table 1: “Envelope” Regressions for District 6, Demonstrating Multicollinearity**

	Inclusion in CD 6 with state partisanship index			Inclusion in CD 6 with state partisanship index + Dem. Pres. vote share		
	Coefficient	Standard error		Coefficient	Standard error	
State partisanship index	-2.317	0.307	***	29.493	6.012	***
Dem. Pres. vote share				-30.742	5.814	***
Constant	1.150	0.175	***	0.446	0.221	*

\*\*\* P value < .001

But it might also be the case that district-drawers considered not only state-level elections, but also presidential elections. Dr. Barber’s view is that if an additional variable might potentially be statistically significant in a model, it *must* be included to avoid the problem of omitted variables. The second regression in Table 1 simply adds the precinct-level presidential vote share to the model. We can see that the coefficients are now wildly different. Moreover, the sign for the coefficient on state partisanship has changed direction and is highly statistically significant. Dr. Barber would have us believe that, in contrast to what we learned from the initial regression, the legislature was trying to *increase* Democratic vote share in District 6 in statewide elections but *decrease* it in presidential elections. But this is an absurd conclusion. The coefficients are unstable and uninformative because we included two highly correlated variables in the same regression.

The same thing is happening with race in Dr. Barber’s analysis. The coefficient in a simple precinct-level regression with BVAP alone indicates that indeed, the larger the Black share of voting-age population in a precinct, the less likely that it is included in District 6. However, when he adds the highly correlated partisanship variable, the coefficient is similar in size but in the opposite direction, and highly statistically significant. This happens with his regressions in Districts 12 and 14 as well. This is not an indication that race “played no role,” but rather, an indication that this regression is just as meaningless as the second model in Table 1 above. One simply cannot disentangle the role of race and party by running precinct-level regressions of the kind Dr. Barber recommends. By themselves, these precinct-level regressions cannot be interpreted as statistical tests of the intentions of those drawing the districts. Whether one examines raw differences in the data or runs regressions, it is clear as a descriptive matter that there are differences between the racial composition of the districts included and excluded from the districts, just as there are differences in partisanship, but precinct regressions in isolation do not allow us to say much more.

To avoid the need to run precinct-level regressions including highly correlated independent variables, I used individual-level data on party registration in my initial report. With this type of data, one can conduct the same types of analysis courts have relied on in the past. One need not



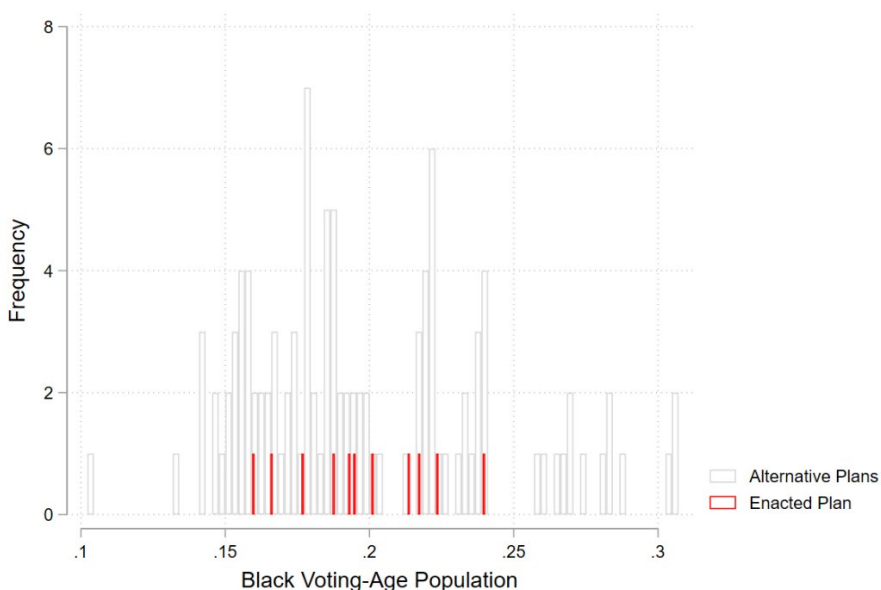
run regressions at all. I showed that the differences in BVAP between those included and excluded from the challenged districts hold up within partisan groups, which suggests that the racial differences are not a mere artifact of partisanship.

## V. ALTERNATIVE REDISTRICTING PLANS CONSIDERED BY THE LEGISLATURE

In my reply report, I examined several alternative redistricting plans that had been considered by the Legislature before they settled on the Enacted Plan. I demonstrated that relative to Dr. Barber's race-blind simulations, those plans produced a distribution of Black voting-age population across districts that was very unusual, and that the distribution was even more unusual in the Enacted Plan. As can be seen in Figures 9 through 11 of my reply report, all the maps considered by the legislature, including the Enacted Plan, created very high Black voting-age population shares relative to Dr. Barber's ensemble of simulated plans in District 1 (in the Northeast) and District 12 (Charlotte), and the BVAP shares of these districts are in a very narrow range in all the alternative maps considered by the Legislature—something that also comes through in Dr. Barber's supplemental report. Due to the constraints of geography, District 11 in the far West has a very similar BVAP share in Dr. Barber's simulations, each of the alternative plans, and in the Enacted Plan.

However, if we focus on the other 11 districts, we can see that the distribution of BVAP is far more condensed in the Enacted Plan than in the alternative plans. In addition to Figure 9 through 11 of my reply report, this can be appreciated in Figure 1 below, which is a histogram of BVAP across all the alternative plans (in gray) and in the Enacted Plan (in red), leaving out districts 1, 12, and 11. The BVAP of the districts of the Enacted Plan are in a narrow range from 16% to 24%, whereas the distribution is wider in each of these alternative plans.

**Figure 1: Histogram of Black Voting-Age Population (BVAP) in Alternative Plans and Enacted Plan (Excluding Districts 1, 11, and 12)**



In both the ensemble of race-blind simulations and in this smaller group of alternative proposals, some rural districts emerged with relatively few Black voters, while other districts emerged with relatively higher BVAP shares. However, it appears that in the Enacted Plan, outside of Districts 1 and 12 (where BVAP was especially high), special care was taken to draw districts that would split Black communities apart and spread them evenly across majority-White districts.

Dr. Barber does not dispute either that the distribution of BVAP in the group of plans considered by the legislature was quite unusual relative to that of his race-blind simulations, or that the distribution of BVAP was more condensed in the Enacted Plan than the alternative plans. Rather, he responds in two ways. First, as with the simulations, he claims that the Enacted Plan might have deviated from the alternative plans because of efforts to protect incumbents and produce safe Republican districts. Second, he provides some descriptive statistics on BVAP in three specific regions, where he argues that the distribution of BVAP appears to be similar in the alternative and Enacted plans. I take up each of these issues in turn.

#### *Partisanship and incumbent protection*

Dr. Barber suggests that differences in the racial characteristics of the districts in the Enacted Plan and the alternative plans are likely due to superior efforts of authors of the Enacted Plan to create safe Republican districts and protect incumbents. Throughout his report, Dr. Barber considers a district to be “safe” if its Republican vote share, using his partisan index, is above 55 percent. But many plans, including the Enacted Plan, include other slightly less safe Republican-leaning districts where the Republican index is above 53 percent but less than 55 percent. According to his data, the Enacted Plan included 9 safe Republican districts and one less-safe district just below the 55% threshold (53.76%).<sup>5</sup> Of the 10 alternative plans for which he provides data in Tables 2 through 4 of his supplemental report, seven similarly have 9 districts with a Republican vote share above 55 percent and at least one additional district above 53 percent, and several of these seven even had an additional district above 53 percent (for a total of 11 Republican districts).

Each of the three plans that fell short of 9 “safe” districts did so in a trivial way. The map marked as CBK-2 (in the September grouping in my reply report) had 8 safe districts, but two additional districts with a Republican vote share of 54 percent. The map marked as CDS-3 (in the Springhetti maps) had 8 safe districts but one at 54 percent and another at 53 percent. The map marked CMT-2 (in the October group of maps) had 8 safe districts, but one with 54.8 percent and another with 54 percent. It is simply not the case that these maps are substantially worse in their anticipated performance for Republican candidates than the Enacted Map.

Next, Dr. Barber suggests that these earlier maps were left behind in favor of the Enacted Plan because they “double-bunked” incumbents. This is a very odd claim. First, the seventh-ranked entry at the bottom of the list in the “2023 Congressional Plan Criteria” used by the Legislature states that the Legislation “may consider... incumbency protection.”<sup>6</sup> This is not a required task, and in any case, there is no residency requirement for Congressional candidates, as the “2023

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<sup>5</sup> See, for example, Tables 2, 3, and 4 in Dr. Barber’s report.

<sup>6</sup> LD0004145.

Congressional Plan Criteria” notes, so it is not clear why “double bunking” would have any material impact on any candidate’s ability to run in the district of their choice.

However, what is especially difficult to comprehend is that, after arguing throughout his reports that the Legislature was aiming to maximize Republican advantage in every choice it made, here Dr. Barber implies that the Legislature was acting to help *Democratic* candidates. He provides a list of 25 instances of double-bunking among the alternative plans and claims that the Enacted Plan was an improvement over those plans because it did not double-bunk the same candidates. He neglects to mention that in two-thirds of these instances, the plans double-bunked Democrats. Not a single plan double-bunked Republicans. Typically, when crafting a partisan gerrymander, a mapdrawer would seek to double-bunk one’s opponents. Thus, several of these alternative plans, by double-bunking and encouraging Democratic incumbents to run against one another would have helped Republicans. Dr. Barber does not explain how the Legislature was somehow acting politically by rejecting the double-bunking of Democrats in the alternative maps.

In fact, the Enacted Plan did double-bunk two Democrats in the Raleigh-Durham area, so it was clearly not the case that the Legislature was trying to eliminate this phenomenon. In any case, Dr. Barber does not explain how any efforts to diminish incumbent pairings could have possibly led the Legislature to create such a condensed distribution of BVAP, or to hew so closely to lines of racial segregation when drawing districts.

After making his observations about partisanship and incumbency, Dr. Barber provides some statistics about race and partisanship in each of three regions in Figures 3 through 5 of his supplemental report. One must read these graphs with care, because within specific regions, many of these alternative maps are identical because their authors made their alterations—sometimes quite small in scale—in a different region, so the graphs do not provide nearly as many independent data points as may appear to be the case. The appendix of my reply report provides maps of each plan, allowing the reader to track the regions where there are differences across alternative plans.

Moreover, Dr. Barber’s Figures 3 through 5 are selective in presenting data on the BVAP and partisanship of specific districts rather than for an entire region. This is important because every choice has knock-on effects for the distribution of racial groups and partisan votes in other surrounding districts—an issue that is especially important in the Piedmont Triad, where the Enacted Plan, as well as the alternative plans, involve a complex confluence of districts that carve up the cities of the Triad in ways that have implications for other surrounding districts, ultimately creating the condensed distribution of BVAP displayed in Figure 1 above.

#### *Northeast North Carolina*

In Figure 3 of his supplemental report, Dr. Barber demonstrates that the Black Voting-Age population of Congressional District 1 is higher in the Enacted Plan than in any of the alternative plans with one exception—CBK-2—where it was higher by less than one percentage point.<sup>7</sup> One can see the same thing in Figures 9 through 11 of my reply report, where the red dot on the far right of each graph is above all the other data markers, with the exception of CBK-2 in Figure 9.

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<sup>7</sup> CMT-2 had exactly the same District 1 configuration as the Enacted Plan.

Those figures also reveal that the BVAP of District 1 is also high relative to any of Dr. Barber's simulations, for which Dr. Barber offers no explanation.

### *Charlotte Area*

In Figures 4 and 5 of his supplemental report, Dr. Barber demonstrates that most of the maps considered by the Legislature divided the Charlotte Area in a similar way. In fact, four of the maps were identical to the enacted map (see the appendix of my reply report), and the others contained only small differences. However, these figures indicate that the Springhetti maps did take a somewhat different approach in Charlotte and surroundings. Specifically, we can see from Figures 4 and 5 in Dr. Barber's report that Black voters were substantially less packed in District 12 in the Springhetti maps, where according to Dr. Barber's calculations, the District 12 BVAP was 36 percent rather than around 39.5 percent, with a configuration that still created a safe District 14 with a Republican partisan index above 55 percent and had the added bonus of placing the two Charlotte-area incumbents in District 12, while also creating a more compact District 14 than in the Legislature's plan.<sup>8</sup> In sum, the Springhetti maps demonstrate that the extreme packing of Black voters into District 12 was not necessary to achieve the same partisan goals as the Legislature's map.

### *Piedmont Triad*

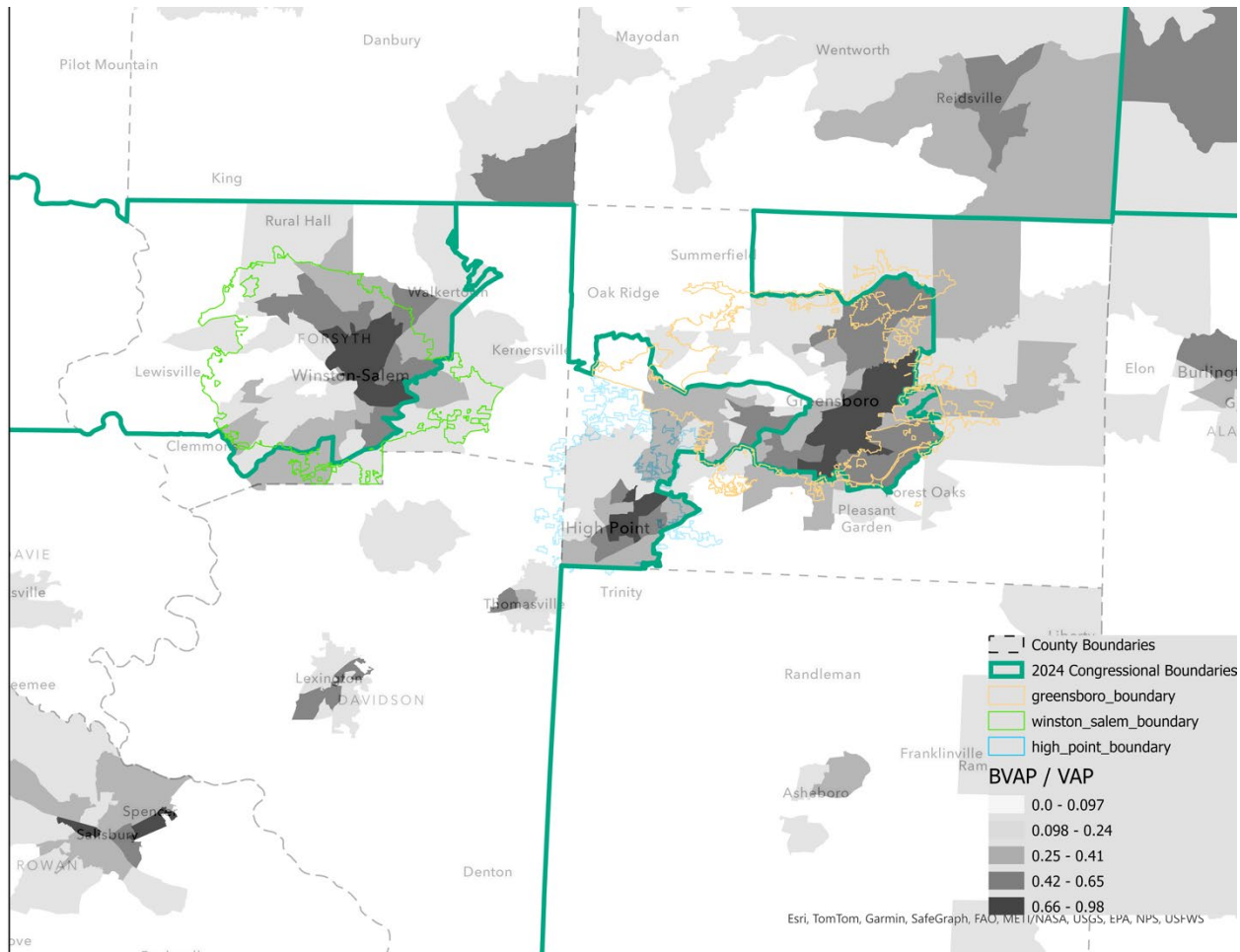
In Figure 6 of his supplemental report, Dr. Barber provides information about some but not all of the relevant districts in the Piedmont Triad area for the alternative maps. Note that he plots BVAP and partisanship only of districts that are contained in Guilford and Forsyth counties, which in many cases misses at least one Piedmont-area district. Each of these alternative maps is also an extreme outlier relative to Dr. Barber's simulations, as these maps also carve up the Piedmont Triad cities and split Black voters across districts in unusual ways that contradict traditional redistricting criteria. As in the Legislature's map, these alternative maps also extract urban voters and combine them with far-flung rural areas.

However, there are still variations in these "cracking" experiments that are worthy of closer consideration. Of the 10 maps Dr. Barber considers, only 3 have a lower maximum BVAP in the Triad Area than the Enacted Map. Each of these—CBP-1, CBP-5, and CBA-2—was one of the group of maps produced in September. These maps were also quite aggressive in the efforts to split Black communities. However, it is useful to take a closer look at some of the plans that were at least somewhat less aggressive.

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<sup>8</sup> The Reock score for District 14 in the Enacted Plan was .29, and .32 for the Springhetti Plans. The Polsby-Popper score was .16 for the Enacted Plan, and .21 for the Springhetti Plan.

**Figure 2: The Enacted Plan in the Piedmont Triad**



First, Figure 2 is a choropleth map of precinct-level BVAP and provides the boundaries of the Enacted Plan and the boundaries of Winston-Salem, High Point, and Greensboro. One can see how the map splits Winston-Salem across two districts and Greensboro across three districts, while also slicing off a piece of High Point, usually drawing district boundaries directly along the lines of racial segregation and keeping the Black voting-age population artificially low in all four districts.

**Figure 3: Alternative Plan “CMT-1” in the Piedmont Triad**

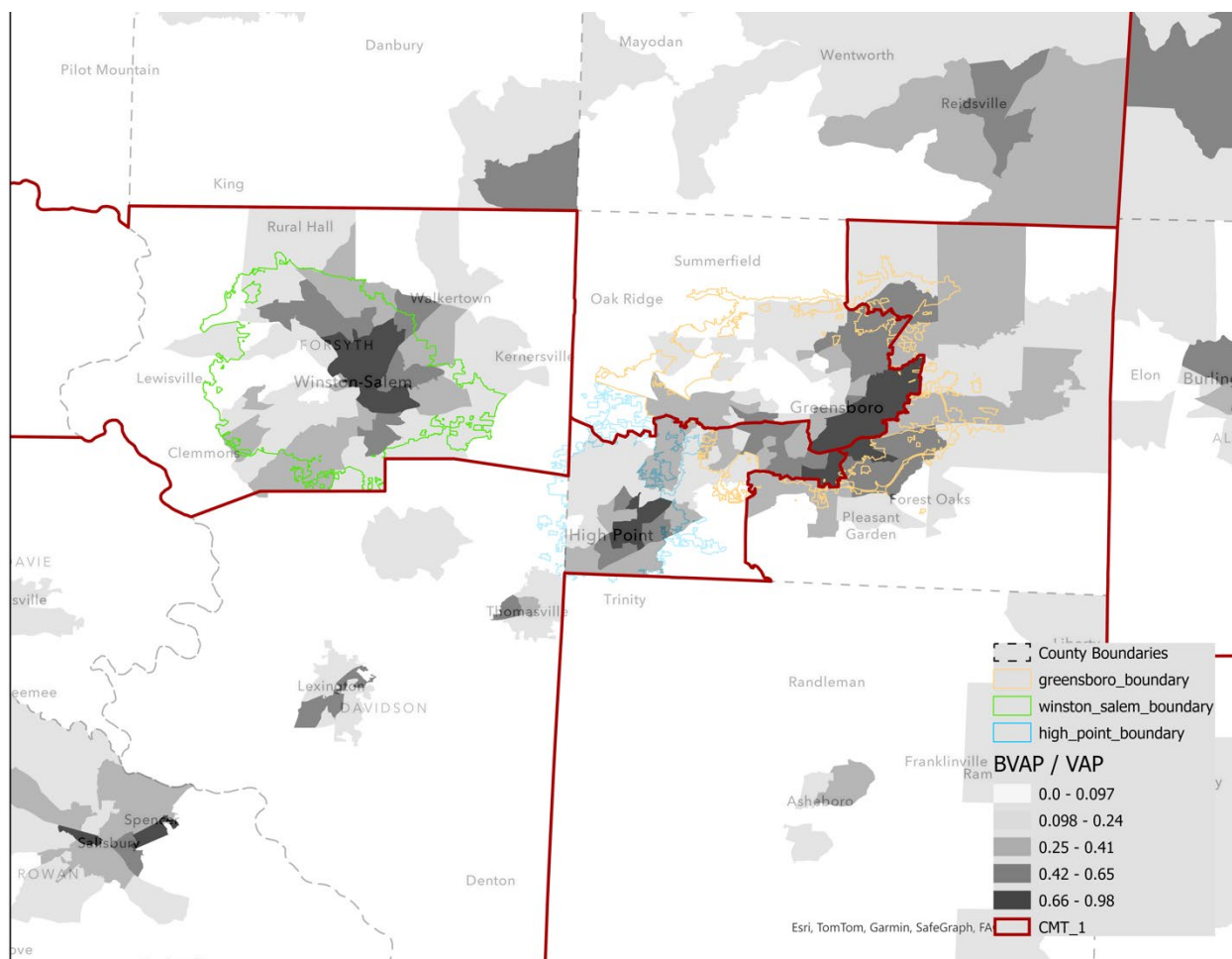
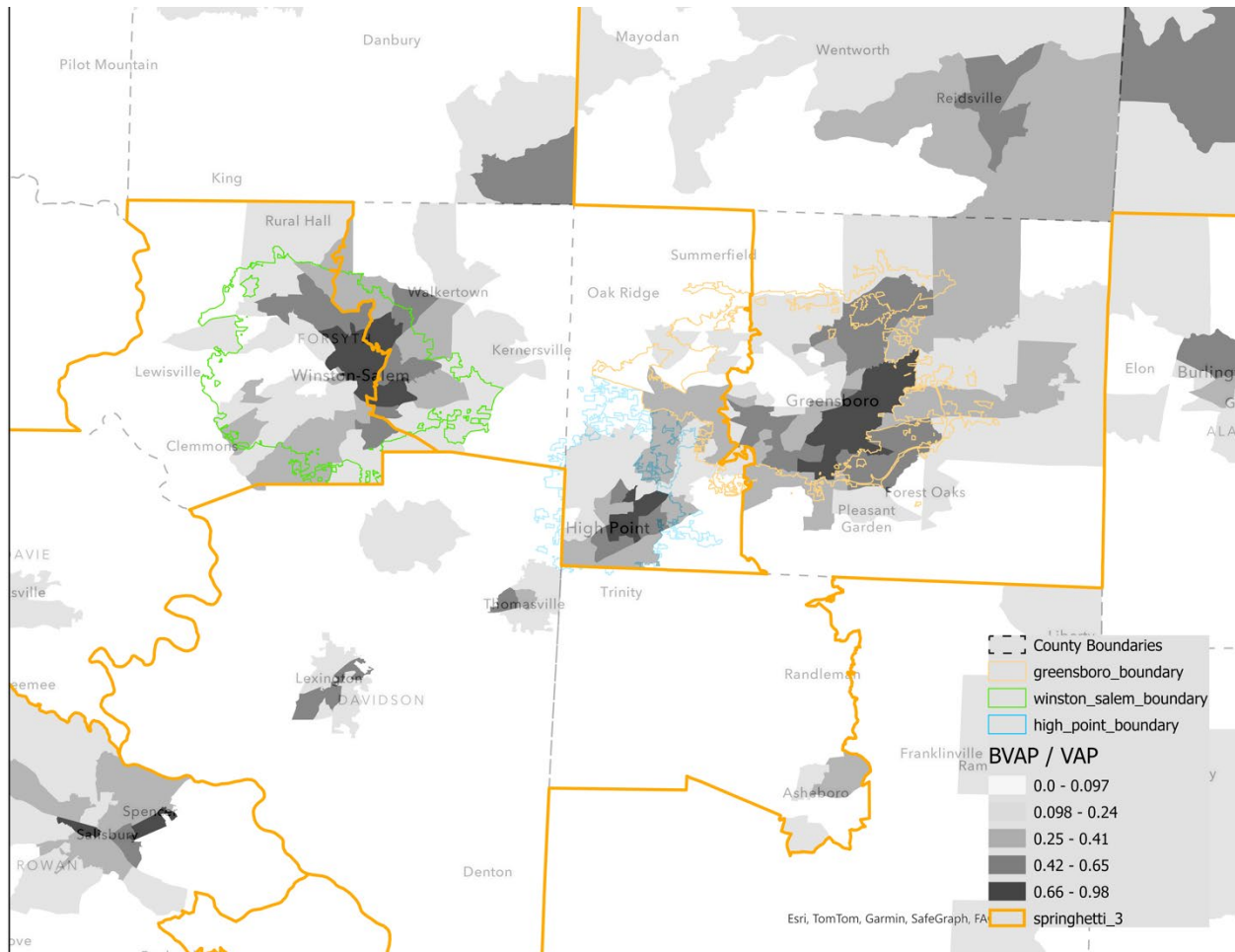


Figure 3 provides the boundaries of the plan “CMT-1,” which was one of the alternative maps produced in October, shortly before the adoption of the final map. This map is identical in the Piedmont Triad to “CMT-2.” While not a paragon of traditional redistricting principles, this map manages to keep Forsyth County and the city of Winston-Salem whole, and while it extracts High Point and part of the Black community of Greensboro, it relies less on boundaries that follow lines of residential segregation. As Dr. Barber’s Figure 6 demonstrates, it produces a clean sweep of districts with a Republican partisan index above 56 percent.



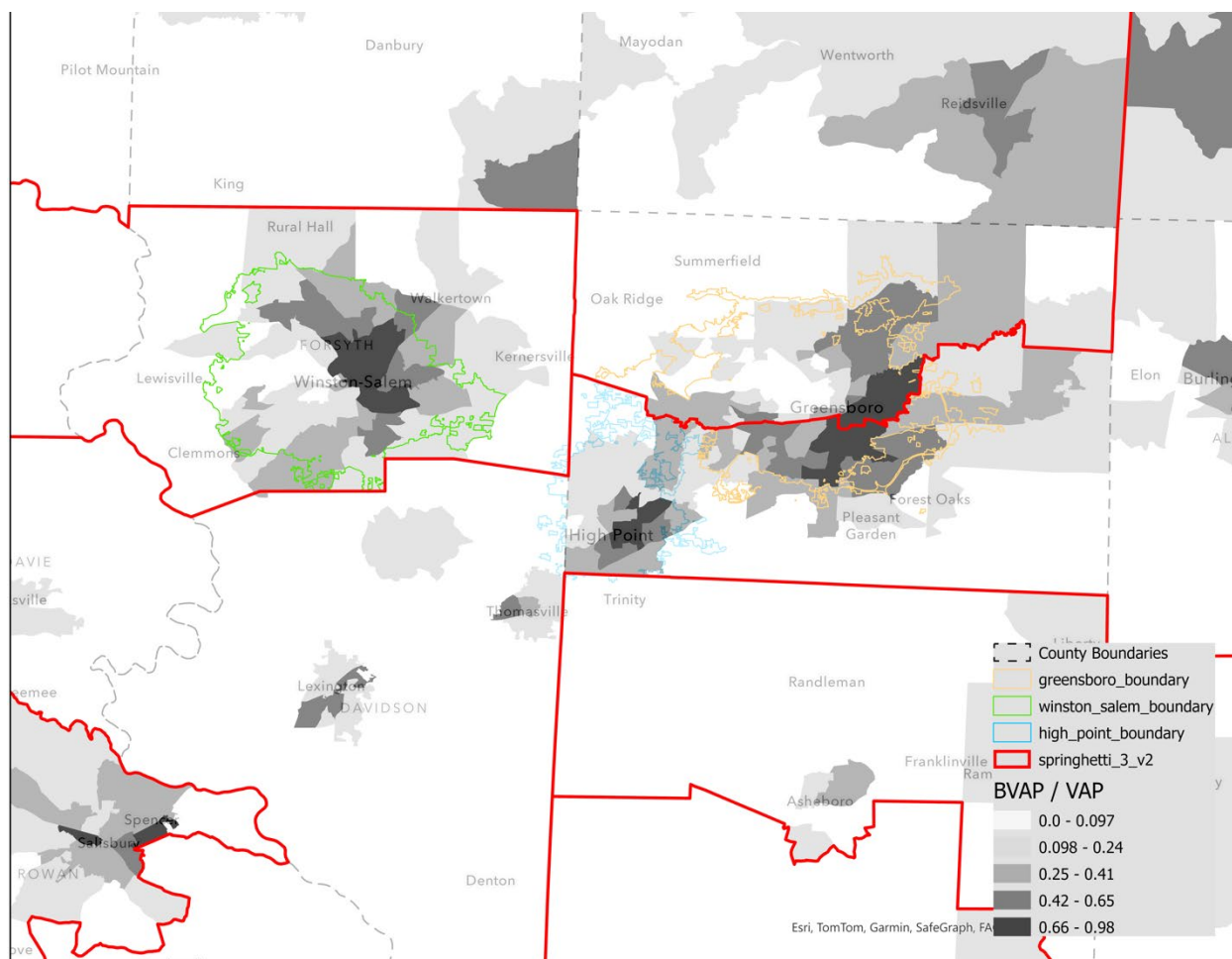
**Figure 4: Alternative Plan “Springhetti 3” in the Piedmont Triad**



Next, Figure 4 examines the alternative map “Springhetti 3,” and Figure 5 displays “Springhetti 3, Version 2.” Springhetti 3 splits Winston-Salem once, whereas version 2 keeps Forsyth County and Winston-Salem whole. Both plans keep High Point together and split Greensboro only once. These plans rely on relatively straight lines and somewhat more compact arrangements rather than careful extractions drawn along lines of racial segregation. In my reply report, I compared the BVAP of adjoining precincts on either side of the district boundaries in the Piedmont Triad districts, showing that they were consistently large (see the tables in Appendix 1). Figures 4 and 5 convey that this was not the case with the Springhetti maps. The Springhetti maps also each produce a District 6 with higher BVAP than in the Enacted Plan—reaching 27 percent in Springhetti 3—while also creating solidly Republican districts throughout the region.



**Figure 5: Alternative Plan “Springhetti 3, v2” in the Piedmont Triad**



In sum, these alternative plans demonstrate that it is possible to create a similar level of partisan advantage for Republicans without working quite so assiduously to split cities with large Black populations and draw districts that follow lines of racial segregation.

## VI. CONCLUSIONS

Dr. Barber’s supplemental report does not cause me to alter any of the conclusions from my previous reports. First, comparisons of Black voting-age population share in areas placed into and drawn out of the challenged districts provide useful information when they are combined with analysis of traditional redistricting criteria and visualization of maps. The fact that such differences also sometimes emerge in race-blind simulations does not detract from their usefulness as part of a holistic analysis.

Second, the distribution of race across districts in the Enacted Plan is very unusual relative to Dr. Barber’s ensembles of simulated plans—even the most extremely pro-Republican plans—and he has not demonstrated that this is due to efforts of the Legislature to protect incumbents or draw safer Republican seats.

Third, precinct-level regressions including racial and partisan variables cannot prove that race played no role in the redistricting process.

Finally, examination of some alternative plans considered by the Legislature demonstrates that it was possible to achieve the same extreme partisan goals as those achieved in the Enacted Plan without the same treatment of Black neighborhoods.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Executed on March 31, 2025.

A handwritten signature in black ink, appearing to read "Jonathan Rodden", written in a cursive style.

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Jonathan Rodden